# D601 Medical Readmission Scenario and Data Dictionary

**Scenario 1: Medical Readmission**

In the healthcare industry, hospital readmissions are a significant concern, leading the Centers for Medicare and Medicaid Services (CMS) to penalize hospitals for excessive cases. Readmission is defined as patients returning to the hospital within 30 days after being discharged from an initial hospitalization. Since CMS introduced these penalties, the percentage of hospitals fined has steadily increased, reaching 78% in 2015. With the recent addition of COPD and joint replacements to CMS's monitored conditions, the percentage of penalized hospitals is expected to rise further. Although hospitals use various strategies to lower readmission rates, fewer than 20% use specialized technology, suggesting they are not maximizing available solutions.

To minimize penalties and improve patient outcomes, hospitals must identify key factors driving readmissions and patterns in readmission rates. This analysis will help hospital executive leaders develop data-driven strategies, such as optimizing discharge planning, enhancing post-hospitalization care, and expanding patient support programs.

You are a data analyst on a team of analysts for a large medical hospital chain with patients in almost every state in the United States. You have been provided a dataset and asked to investigate readmission data for this chain of hospitals. You have been asked to analyze the dataset and build a data dashboard to enable executive leaders to explore the data, identify trends, and compare key metrics.

**Audience Background**

*Executive Leaders*

You will build a Tableau data dashboard that the following executive leaders of your organization will use to guide their decision-making. As described below, each leader has a specific focus and area of expertise in the organization, but they do not have a technical data analysis background like yours. As a result, the dashboard you build must be easy to navigate and should present broad and understandable insights from the data relevant to their perspectives.

Senior Vice President of Hospital Operations (SVP)

- o   The SVP oversees hospital operations across all locations, ensuring regulatory compliance, and high-quality patient care.
- o   They are interested in demographic and regional trends in patient outcomes.

Executive Vice President of Research (EVP)

- o   The EVP leads initiatives to identify patterns in patient care using data-driven strategies to reduce readmissions.
- o   They are interested in research that uncovers patterns in patient demographics, medical conditions, and hospital procedures that influence patient outcomes.

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Chief Medical Officer (CMO)

- The CMO oversees clinical operations, patient care strategies, and quality improvement initiatives across all hospital locations.
- They are interested in how readmission rates correlate with patient demographics, conditions, and treatment plans to enhance care to reduce readmissions.

*Data Analytics Peers*

You work on a team of data analysts who have technical backgrounds similar to yours. Members of this team are research-minded and have a specific interest in how the design, methodology, and results of a data analysis can be translated to specific business insights. Your peers are eager to hear you tell an engaging story about your data analysis, dashboard elements, and an explanation of your design choices.

**Data File Being Used:**

Medical_Readmission_Data.csv

**Data Dictionary:**

The dataset consists of the following categories of information:

- **Patient Demographics:** patient background and location details
- **Patient Readmission:** patients who were readmitted with 30 days
- **Patient Hospitalization Information**: patient services received and financial details
- **Patient Health and Medical Conditions:** patient habits, conditions, and risk factors
- **Patient Survey Responses:** patient's rankings of hospital-related factors based on importance

  *Note: Although the dataset does not include the original reason for hospitalization, it contains information on patient conditions and other factors that can be used to analyze patterns.*

The dataset consists of 10,000 patients and 50 columns, or variables:

- CaseOrder: a placeholder variable to preserve the original order of the raw data file
- Customer_id: unique patient ID
- Interaction, UID: unique IDs related to patient transactions, procedures, and admissions

**Patient Demographics:**

- City: patient city of residence as listed on the billing statement
- State: patient state of residence as listed on the billing statement
- County: patient county of residence as listed on the billing statement

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- o   Zip: patient zip code of residence as listed on the billing statement
- o   Lat, Lng: GPS coordinates of patient residence as listed on the billing statement
- o   Population: population within a mile radius of patient based on census data
- o   Area: area type (rural, urban, suburban) based on unofficial census data
- o   TimeZone: time zone of patient residence based on patient's sign-up information
- o   Job: job of the patient (or primary insurance holder) as reported in the admissions information
- o   Children: number of children in the patient's household as reported in the admissions information (might not be children of the patient)
- o   Age: age of the patient as reported in admissions information
- o   Income: annual income of the patient (or primary insurance holder) as reported at time of admission
- o   Marital: marital status of the patient (or primary insurance holder) as reported on admission information
- o   Gender: patient self-identification as male, female, or nonbinary

**Patient Readmission:**

- o   ReAdmis: whether the patient was readmitted within 30 days of release (yes, no)

**Patient Hospitalization Information:**

- o   VitD_levels: patient's vitamin D levels as measured in ng/mL
- o   Doc_visits: number of times the primary physician visited the patient during the initial hospitalization
- o   Full_meals_eaten: number of full meals the patient ate while hospitalized (partial meals count as zero, and some patients had more than three meals in a day if requested)
- o   VitD_supp: number of times that vitamin D supplements were administered to the patient
- o   Initial_admin: how the patient was admitted into the hospital initially (emergency admission, elective admission, observation)
- o   Services: primary service the patient received while hospitalized (blood work, intravenous, CT scan, MRI) (Note: The patient may have received more services, but only the primary service is reported.)
- o   Initial_days: number of days the patient stayed in the hospital during the initial visit
- o   TotalCharge: amount charged to the patient daily; value reflects an average per patient based on the total charge divided by the number of days hospitalized. This amount reflects the typical charges billed to patients, not including specialized treatments.
- o   Additional_charges: average amount charged to the patient for miscellaneous procedures, treatments, medicines, anesthesiology, etc.

**Patient Health and Medical Conditions:**

- o   Soft_drink: whether the patient habitually drinks three or more sodas in a day (yes, no)
- o   HighBlood: whether the patient has high blood pressure (yes, no)
- o   Stroke: whether the patient has had a stroke (yes, no)
- o   Complication_risk: level of complication risk for the patient as assessed by a primary patient assessment (high, medium, low)
- o   Overweight: whether the patient is considered overweight based on age, gender, and height (yes, no)

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- o  Arthritis: whether the patient has arthritis (yes, no)
- o  Diabetes: whether the patient has diabetes (yes, no)
- o  Hyperlipidemia: whether the patient has hyperlipidemia (yes, no)
- o  BackPain: whether the patient has chronic back pain (yes, no)
- o  Anxiety: whether the patient has an anxiety disorder (yes, no)
- o  Allergic_rhinitis: whether the patient has allergic rhinitis (yes, no)
- o  Reflux_esophagitis: whether the patient has reflux esophagitis (yes, no)
- o  Asthma: whether the patient has asthma (yes, no)

**Patient Survey Responses:**

The following variables represent responses to an eight-question survey asking patients to rate the importance of various factors on a scale of 1 to 8 (1 = most important, 8 = least important):

- o  Item1: Timely admission
- o  Item2: Timely treatment
- o  Item3: Timely visits
- o  Item4: Reliability
- o  Item5: Options
- o  Item6: Hours of treatment
- o  Item7: Courteous staff
- o  Item8: Evidence of active listening from doctor

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